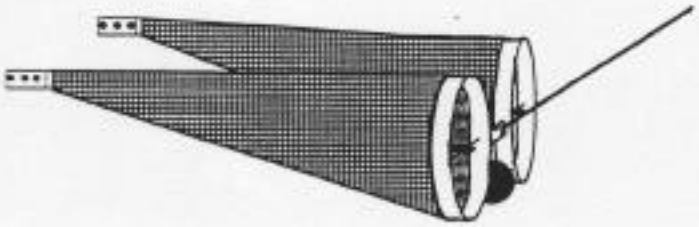
Appendix A.

60BON (60 cm Bongo)



The 60 cm bongo array, with paired plankton nets on a frame, a 40-kg lead ball for a depressor, is used for standard double oblique MARMAP tows. A CTD(Seacat) or electronic BKG should be attached to the wire above the bongo frame to provide real-time tow data. The depth of the nets are monitored from DataPlot and commands given to stop the winch and begin retrieval. When the nets surface, they are brought aboard ASAP and hosed down to wash the sample into the codend. Flowmeters in the nets record the amount of water filtered and a CTD records the depth profile of the tow. Tows not meeting specifications may be repeated at the discretion of the scientific watch. The scientists are responsible for recording times and maximum depths in the Seacat log book.

On selected tows (FOX time series (e.g. Line 8), and certain patch or transect studies) a 20cm bongo frame with (2) 0.150mm mesh nets will be attached 1 meter above the 60cm bongo frame using the special cable provided that has stops to attach the 20cm bongo frame (see **20BON**).

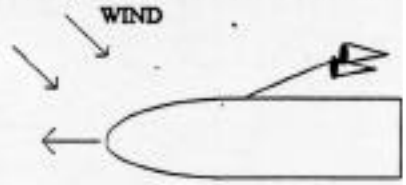
Assembly

Assembly of the bongo array is simple. Attachment of the nets requires sliding the open end of the net over the frame and securing with a stainless steel clamp. The lead ball is shackled to the center pivot on the frame. The survey tech should be responsible for mounting the Seacat CTD (or EBKG), and will require about 1/2 hour to connect. The flowmeters are mounted in the center of the mouth openings using heavy monofilament and nico-press sleeves, attached to eyebolts on the frame.

Rates/Fishing

- Prepare for the tow while the ship is approaching the station. Make sure the proper collecting bucket (or sock) is attached to the proper net, check the flowmeter, prepare field logs (DSDB), jars and jar labels.
- 50 meters/minute wire out speed (if winch speed permits, but at least 40 m/min). During periods of bad weather and heavy surge, instruct the winch operator to start wire out at a slower rate (20-30 m/min) to prevent backlash on the winch, speeding up as conditions permit.
- 20 meters/minute wire in speed.

- The ship speed is adjusted to maintain a 45 degree wire angle, 1.5- 2.0 knots. There should be an angle indicator (inclinometer) mounted on the towing cable monitored by the survey tech reading wire angles to the bridge. The bridge (on the Miller Freeman) should have a bridge readout to assist in maintaining the 45 degree wire angle.
- Perform tows in a single direction as indicated: This position relative to the wind helps insure against the net and cable being run over by the ship.



Preservation

Preservation of samples will depend on cruise requirements. Usually one or both nets will be a QTowF, and possibly a QTowS, RCount or Discard. The Cruise instructions and/or the Chief scientist should have specific information for each net and sample type.

For QTowF, place cod end in bucket and immediately take into laboratory for processing. Gently wash contents into a Tyler sieve (**make sure mesh size of sieve is not larger than mesh in cod-end**) and then wash material into a funnel placed in the mouth of a 32 oz. jar. Leave room in jar to add 50 ml of buffered formalin, fill rest of jar with seawater if necessary.

Maintenance

The only maintenance needed is to check nets for holes or rips and repair or replace as necessary. Check flowmeter counts after each tow, and periodically check to make sure they are filled with water. Immediately replace any suspect flowmeters.

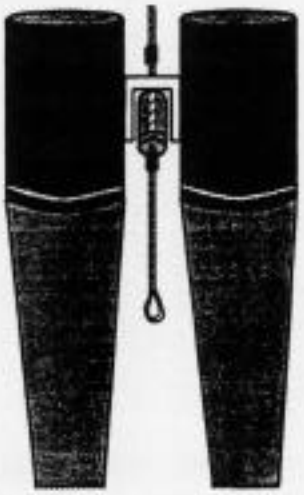
Sampling Protocol Guideline

Determining which mesh to use and depth to fish is decided by the time of the year, size of eggs/larvae, is zooplankton required ?, and bottom depth. This table is meant to be a guideline, the Chief scientist or Principal Investigator should inform shipboard personnel to specific requirements as to net mesh size and sample processing.

	Net 1	Net 2	Sample Depth
Pollock Eggs	.505 QTowF	.505 RCount Discard	5 -10m within bottom (400m max)
Larvae < 6mm	.333 QTowF	Varies	5-10m within bottom (400m max)
Larvae ≥ 6mm	.505 QTowF	Varies	100m (or 5-10 within bottom if shallow
FOX Sta, Zooplankton studies (with 20cm Bongo)	.505 QTowF or .333 (same as 'Grid')	**.333** QTowF Never .505 for Zoops	**5-10m within bottom**

Info provided by: J. Clark 9 Mar 95

20BON (20 cm Bongo)



The 20 cm Bongo array as we use it, is deployed simultaneously with the 60 cm Bongo array (see **60BON**). The standard use of the 20 cm Bongo is to collect zooplankton with 150 micron mesh nets, while the 60 cm Bongo collects a sample with 333 micron mesh.

Assembly

Assembly only requires attachment of the nets, and mounting of the flowmeters. Nets are attached in the standard manner, using a stainless steel hose clamp to secure the nets on the frame. Make sure some of the heavy nylon material extends over the end of the frame a bit (1/2 inch) to help protect the fine mesh of the nets during normal bumps and setting of the frame on deck.

Rates/Fishing

The 20 cm array is placed about 1 meter above the 60 cm bongo frame using the special cable provided that has stops (nicopress sleeves) to attach the 20 cm frame. Grasp the 20 cm frame with the net numbers on one side of the frame facing up. Have the nets of the 20 cm bongo straddle the towing cable, turn the top of the brass swivel in the middle of the frame so the cable (between the two stops) can be placed in the groove. Turn the top of the swivel back, and secure with the cotter pin found at top of swivel.

It is helpful when the nets are going over the side for someone to hold the 20cm codends up above the 60cm frame to avoid tangling, also watch that the Seacat does not hit the inclinometer. Watch as the nets are on the surface and start down to make sure all nets are OK.

Rates - same as 60 cm Bongo
- Ship speed 1.5-2.0 knots to achieve 45 degree towing angle.
- 50 meters/minute wire out speed, winch and weather permitting.
- 20 meters/minute wire in speed.

The 20cm/60cm bongo array will be monitored from Dataplot, and commands given to the winch operator to stop and/or retrieve the tow. Unless specified otherwise, these tows will be fished to within 5-10 meters of the bottom, and will have .153mm mesh.

Preservation

Preservation will depend on cruise requirements, usually QTOWF

Maintenance

Standard stuff.

Info provided by: J. Clark

22 Feb 95